

Application No.: 10/823,244

Docket No.: JCLA12737

**REMARKS****Present Status of the Application**

The Office Action rejected all presently-pending claims 1-17. Specifically, the Office Action rejected claims 1-9 under 35 U.S.C. 102(b), as being anticipated by Dikeman et al. (U.S. 5,932,8981). The Office Action also rejected claims 10-17 under 35 U.S.C. 103(a) as being unpatentable over Pequignot (US 6,891,207) in view of Cottrell (U.S. 4,626,882).

Applicants have amended claims 1 and 10 to overcome the rejections. After entry of the foregoing amendments, claims 1-17 remain pending in the present application, and reconsideration of those claims is respectfully requested.

**Discussion of Office Action Rejections**

*Applicants respectfully traverse the 102(b) rejection of claims 1-9 because Dikeman et al. (U.S. 5,932,8981) does not teach every element recited in these claims.*

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the .... claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8<sup>th</sup> ed., 2001.

The present invention is in general related a junction diode as claim 1 recites:

Claim 1. A junction diode, comprising:  
a first conductive type substrate;

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a second conductive type embedded region, formed within the first conductive type substrate;

a second conductive type well, formed within the second conductive type embedded region, wherein the second conductive type well has a dopant concentration smaller than the second conductive type embedded region, *and the second conductive type embedded region surrounds the second conductive type well;*

a first conductive type doped region, formed in the second conductive type well; and  
*at least two second conductive type doped regions, formed in the second conductive type embedded region beside the first conductive type doped region.*

Dikeman fails to disclose, teach or suggest the feature of that the second conductive type embedded region surrounds the second conductive type well, and at least two second conductive type doped regions are formed in the second conductive type embedded region beside the first conductive type doped region. Dikeman teaches the buried layer 52 (heavily doped N-type semiconductor material) is formed at the N-epi 54 and P-type substrate 50 interface. The sinker 58 (heavily doped N-type semiconductor material) extends through the N-epi layer 54 and into the buried layer 52. In other words, the sinker 58 and the buried layer 52 do not surround the N-epi 54. In addition, the N+ region 60 is formed within the sinker 58. The N+ region 68 is formed within the nhv regions 64 which are formed within the p-well 62. In other words, Dikeman fails to teach the feature of that at least two second conductive type doped regions are formed in the second conductive type embedded region beside the first conductive type doped region.

Therefore, Dikeman does not teach every element recited in claim 1. Applicant respectfully submits that independent claim 1 patentably defines over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-9 patentably define over the

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prior art as a matter of law, for at least the reason that these dependent claims contain all features of their respective independent claim 1.

*Applicants respectfully traverse the rejection of claims 10-17 under 103(a) as being unpatentable over Pequignot (US 6,891,207) in view of Cottrell (U.S. 4,626,882) because a prima facie case of obviousness has not been established by the Office Action.*

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must “be found in the prior art, and not be based on applicant’s disclosure.” See M.P.E.P. 2143, 8<sup>th</sup> ed., February 2003.

The present invention is also related a junction diode as claim 10 recites:

Claim 10. A junction diode, comprising:  
a first conductive type substrate;  
a second conductive type deep well, formed within the first conductive type substrate;  
a first conductive type well, formed within the second conductive type deep well;  
a first conductive type shallow well, formed within the first conductive type well, wherein the first conductive type shallow well has a dopant concentration smaller than the first conductive type well;  
a plurality of first conductive type doped regions, formed in the first conductive type well;  
and  
a plurality of second conductive type doped regions formed in the first conductive type shallow well and the second conductive type deep well, *wherein the second conductive type doped region formed in the first conductive type shallow well is isolated from the second*

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*conductive type deep well by the first conductive type well and the first conductive type shallow well.*

Pequignot fails to teach or suggest the feature of that the second conductive type doped region formed in the first conductive type shallow well is isolated from the second conductive type deep well by the first conductive type well and the first conductive type shallow well. In Fig. 2 of Pequignot's reference, the n type doped region 3A extends through the p- doped regions 6, 6A and connects with the n doped regions 8, 8A. In other words, the n type doped region 3A is not isolated from the n doped regions 8, 8A. In Figs. 5, 6, 14 of Pequignot's reference, the p doped regions 5 are formed in the p- doped regions 6, and the n doped regions 1 are also formed in the p-doped regions 6. Pequignot fails to teach that the p doped regions 5 is formed in a p-doped region having a dopant concentration smaller than another p doped region in which the n doped regions 1 are formed.

In claim 10 of the present invention, because the second conductive type doped region formed in the first conductive type shallow well is isolated from the second conductive type deep well by the first conductive type well and the first conductive type shallow well, and the first conductive type shallow well has a lower dopant concentration than the first conductive type well, the first conductive type well can prevent a current flowing from the second conductive type doped region into the first conductive type shallow well from directly impinging the second conductive type deep well to cause junction diode failure due to a large depletion region in the first conductive type shallow well. Therefore, Pequignot fails to disclose, teach or suggest every element in claim 10.

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Cottrell also fails to teach or suggest the feature of that the second conductive type doped region formed in the first conductive type shallow well is isolated from the second conductive type deep well by the first conductive type well and the first conductive type shallow well. In Cottrell's reference, the N<sup>+</sup> region 50 formed within the P region 46 is isolated from the N well 42 by the N well 44 and the P region 46 having different conductive types. Cottrell can not cure the deficiencies of Pequignot. Therefore, independent claim 10 is patentable over Pequignot and Cottrell, and should be allowed. For at least the same reasons, dependent claims 11-17 patently define over the prior art as a matter of law, for at least the reason that these dependent claims contain all features of their respective independent claim 10.

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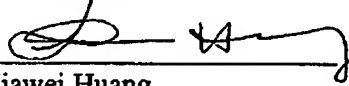
**CONCLUSION**

For at least the foregoing reasons, it is believed that the pending claims 1-17 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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